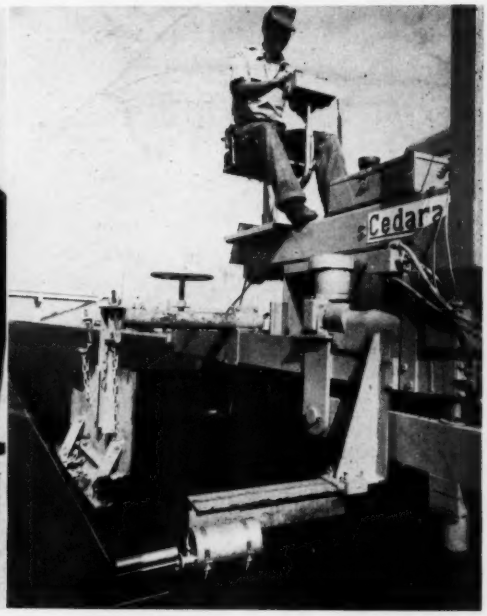
ERVING THE PROFESSION OF ENGINEERING

92 ND YEAR

Midwest Engineer

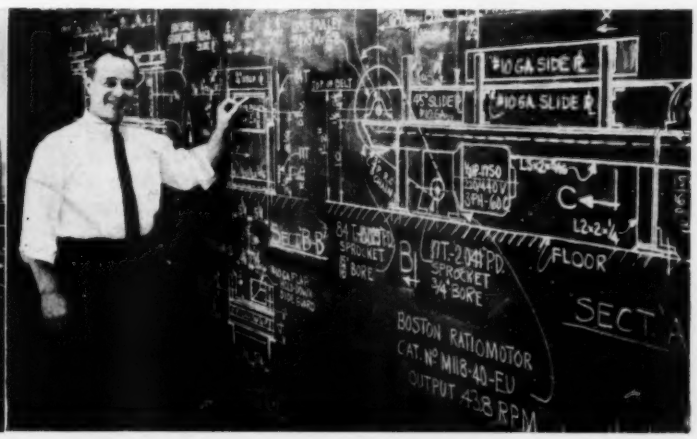
NOVEMBER 1961 VOL. 14 NO. 3

L to R: Dr. Robert P. MacFate, Dr. John Possi, and Dr. Samuel L. Andelman examine radiation detector loaned to Board of Health by Radiation Instrument Laboratories, Inc. President of firm, LaVerne Hartzer, at far right. Page 4.



New paver control system enables road pavers to lay perfectly smooth mats automatically, even on rough roadbeds. Page 16.

Composite view visualizes how new Michigan Terrace apartments will add to skyline when completed. Features will be a fallout shelter and highest-above-ground swimming pool. Page 11.



New Panoramic Design Technique uses wall-size blackboards instead of conventional drawing boards, effecting large savings in engineering, and drafting costs. Page 10.

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Analytical Reference Service Aids Air, Water Studies

Over a hundred agencies throughout the country are now engaged in a cooperative program of laboratory-method evaluation according to J. H. Phillips, Head, Service Laboratories, Nalco Chemical Company, Chicago, Ill.

They are members of the Analytical Reference Service, a voluntary association of federal, state, and municipal agencies, and of industries and universities conducting laboratory programs, many of them public health laboratories. The Service is conducted by the Training Program of the Robert A. Taft Sanitary Engineering Center in Cincinnati, Ohio, a major research center of the U. S. Public Health Service.

Nalco was the first industrial laboratory to be admitted to the ARS. Now, Nalco and other companies and agencies have joined in the cooperative effort to improve laboratory analytical methods.

The idea of an Analytical Reference Service originated in 1952 with a request from officials of the Arkansas State Board of Health to the Sanitary Engineering Center for evaluation of chemical analyses of water.

President Rettaliata of IIT Voices Concern Over Decline in Engineering Enrollments

Total engineering enrollments in the nation's colleges and universities continued to decline for the third straight year, despite the fact that overall enrollments are at a record high, *President John T. Rettaliata* reported to the annual meeting of the board of trustees of Illinois Institute of Technology.

Rettaliata, speaking before the board at the Chicago Club recently, warned that these decreases in engineering enrollments "constitute a serious setback in a field vital to our national security and growth." He cited the difference in total enrollments between 1960 and 1957 as amounting to 25,277 students, and remarked that this is "a severe loss for the field of engineering to bear."

In view of this jeopardy to our technological growth, *Rettaliata* urged this country's educators to "devise methods and find means to induce a greater number of qualified students to enter the engineering field and see their courses through to completion."

Commenting in his report upon the competition between the U. S. and the Soviet Union, *Rettaliata* said, "Every new development in space technology means world prestige gained or lost and, even if we do not acknowledge a 'space race' with the Soviet Union, we most certainly are vying with them for world prestige. Largely for this reason, the federal government more and more is underwriting the costs of much of the research now carried on in the United States, especially research in space matters.

"We should be alert to see that this freer flow of government funds does not lead to federal subsidization of our nation's institutions of higher learning, for it is only a step further to control and, thence, destruction of the proud American tradition of academic freedom. In its mad scramble to attain space prestige, Russia has long ago surrendered its academic freedom for an inflexible system of disciplined education, but we should not be deluded into believing that her space achievements are due to an educational system superior to ours.

"In the Soviet Union, higher education is used as a tool to accomplish the purpose of the state. Our concept of higher education deals with the development of the individual, with concomitant benefit to the nation; the Russian philosophy concerns itself with development of the state, with any enhancement of the individual in the process being of secondary importance. The attainment of immediate material objectives is the predominant motivation. As a result, the product of such a program is intensely specialized, quite well equipped to perform his intended utilitarian function, but he is not a well-rounded individual."

Rettaliata stated, "The responsibility for the attainment of greater competence, to a large extent, rests with the nation's institutions of higher learning. We must be able to provide the required technological education. Our single most important objective is to develop people with the ability to carry out the work to be done.

"To carry out the kind of educational program needed to fulfill our objectives, adequate financial support will obviously be required. Undoubtedly there is a proper role for the government in the support of higher education, particularly in the area of basic research where payment is for services rendered. Outright subsidy, however, is dangerous. . . ." He concluded that "It is hoped that the financial support which we so urgently need will come from private sources rather than the federal government."

Dresden Plant Reopens; Capacity May Be Upped

Commonwealth Edison's Dresden Nuclear Power Station, which was shut down October 2 for scheduled inspection and overhaul work, has produced nearly 700,000,000 kilowatt-hours of electricity. The plant is expected back in full operation around the middle of November.

Addressing the recent Atomic Industrial Forum at the Conrad Hilton hotel in Chicago, Murray Joslin, vice president of Commonwealth Edison Company, said that the utility is considering expanding the generating capacity of the Dresden Nuclear Power Station. He said that sufficient space is available at the Dresden facility, 50 miles southwest of Chicago for additional generating units.

Such additional generating units would result in the reduction of manpower requirements per unit and, in turn, reduce operating costs.

Mr. Joslin commented that the performance had exceeded expectations and that the net kilowatts — 4,000 kilowatts higher than the design value.

Ninety persons are now on the Dresden staff, forty of whom are assigned to plant operation with the others engaged in technical, maintenance and administrative responsibilities. These manpower requirements are now about the same as those of a conventional steam generating plant. However, planned revisions of functions are expected to reduce the number of workers required.

Mr. Joslin said that two unplanned shutdowns for redesign of equipment had occurred in the last two years, both involving control rod drives. He continued that "both the successes and the problems, or rather the solutions of the problems have contributed to the inventory of knowledge about nuclear power."

Recognition was given to General Electric Company for its major role in the design and construction of the first large scale atomic power electric generating plant.

Concluding, Mr. Joslin said, "The capability of Dresden to generate electricity in excess of design value and to operate as a regular part of Commonwealth Edison's system has been demonstrated.

Board of Health Uses New Fallout Detector

The radiation detection instrument pictured on the cover, and loaned to the city by its manufacturer, was put into service early last month.

Dr. Samuel Andelman, City Health Commissioner, has stated that the $15,000,000 device will not only reveal the amount of fallout Chicago receives but will also indicate just which isotopes are involved. Officials will know if such isotopes as iodine 131, strontium 90, cesium 137 or other fission products are among samples collected.

Pictured on the cover:

Dr. Robert P. MacFate, Chief of Laboratories, Chicago Board of Health.

Dr. John Polli, Supervisor of Chemical Laboratory, Chicago Board of Health.

Dr. Samuel L. Andelman, City Health Commissioner.

LaVerne Hartzer, president Radiation Instrument Development Laboratory, Inc., Melrose Park, Ill.

Chicago is said to be the first large city in the country to put this fallout detection apparatus to use.

Samples taken on the roof of the board of health headquarters at 54 West Hubbard St. are fed into the instrument.

Heart of the system is a multi-channel pulse height analyzer. This is fed information by a scintillation detector and which prints final data with an IBM typewriter.

To help you understand what happens when the new *RIDL* Radiation Detection System goes into operation, here is a vastly simplified version.

First, a "group photograph" is taken of deadly radiation in fallout. Then individual pictures of each radio-isotope are "peeled" from the group. This is possible because each separate radio-isotope found in fallout or in natural radiation has its own characteristic "picture" of energy.

With a scintillation detector and pulse height analyzer, the various "energy Peaks" — the "pictures" that identify each radioisotope — are separated, and, therefore, identified.

Only Gamma detection allows the separating of energy which is accomplished by the new system. Scintillation detectors are used in Gamma detection. The *RIDL* detection system is used in many laboratories and physics laboratories throughout the country.

While gross counting studies of radiation by Gamma or Beta methods have been used to estimate the percent of increase caused by atom bombs over natural radiation, the separate identification of each radioisotope (radionuclide) is a definite improvement over earlier methods.

Calendar of Chicago Engineering

—NOV. 15, WED., Noon Luncheon Meeting, 12:00 Noon. At WSE Hq.
—NOV. 22, WED., No WSE Noon Luncheon. Reserved for ASME.
—NOV. 28, TUES., General Meeting and Dinner. Social hour (5:15-6:15 P.M.). Dinner (6:15). Technical Session (8:00 P.M.). At WSE Hq.
—NOV. 29, WED., Noon Luncheon Meeting, 12:00 Noon. At WSE Hq.
—DEC. 5, TUES., Ladies Night-Christmas Party at WSE Hq.
—DEC. 6, WED., Noon Luncheon Meeting, 12:00 Noon. At WSE Hq.
—DEC. 13, WED., Noon Luncheon Meeting, 12:00 Noon. At WSE Hq.

"Can the Research Scientist Acquire a Management Attitude . . . ?"

"Can the Research Scientist Acquire a Management Attitude?" is the title of, and the basic question underlying, a printed discussion now being offered by Battelle Memorial Institute to representatives of industry concerned with research and development. Written by M. R. Nestor, Battelle's manager of project development, the statement is one of a series on the procedures and characteristics of contract research for industry being published by the Columbus, Ohio, research center.

In this statement, Nestor makes the point that industrial management people and research professionals have much in common, including a high degree of creativeness. Industry's practical needs and the professional's desire for creative freedom are compatible, he asserts.

Case histories are cited in which the research professional's suggestions for work in areas not previously considered are applauded by management men responsible for their company's research and development activities. Such initiative is encouraged, according to Nestor.

The Battelle spokesman reports that the average research professional wants to see the results of his work applied to industrial production and social betterment. For this reason, he acquires a feel for economics and will not recommend proposed research projects, if technological and market factors indicate that the research effort will not fill a real need.

Applications

(Mrs.) Patricia A. Jacobsen, Secy. & Treas., Viking Heating Co., 1216 Irving Av., Berkeley, Ill.

John Burg, Power Sales Engr., Commonwealth Edison Co., 72 W. Adams St.

Ronald T. Hooper, Sales Engr., Granco Steel Products Co., 101 S. Washington, Park Ridge, Ill.

H. J. Roth, Mgr., Area Indust'l. Dev., Northern Illinois Gas Co., 615 Eastern Av., Bellwood, Ill.

Robert J. Eby, Admin. Assist., Northern Illinois Gas Co., 615 Eastern Av., Bellwood, Ill.

Charles J. Sener (Rein.), Staff & Personnel Engr., Illinois Bell Telephone Co., 208 W. Washington St.

Vincent Mlcuch, Jr., Plant Engr., Western Electric Co., Inc., Hawthorne Station.

Kenneth M. Arenberg, Executive Officer, Ohmite Manufacturing Co., 3601 Howard St., Skokie, Ill.

Phillip Gross, Pres., Phillip S. Gross & Associates, 441 N. LaSalle St.

Frederich S. Mendelsohn, Const. Engr., Phillip S. Gross & Associates, 441 N. LaSalle St.

John M. Decker, Planning Engr., Western Electric Co., Inc., Hawthorne Station.

James Carroll, 8507 S. Ada St.,—attending Illinois Institute of Technology.

This article by William R. Marston (president of the Western Society of Engineers—1958-59) appeared originally in the September issue of Commerce, published by the Chicago Association of Commerce and Industry.

Unclogging Chicago Art

City comes to grips with problem of creative tra

By WILLIAM R. MARSTON

First Deputy Commissioner, Department of Streets and Sanitation, City of Chicago

I plan to take a very unscientific approach to the transportation problems facing Chicago and the surrounding areas. We have been fooling around with O-D surveys, cost benefit ratios and complicated formulae for calculating everything from merging distances to 1980 expansions of trips to visit grandma. So much effort has been expended in proving that we cannot afford *not* to build an ever increasing mileage of freeways that we have been sweeping some of our basic problems under the rug. It might be an interesting change to hear a different approach from one who is involved in stretching tax dollars.

Because some of my later remarks may be misunderstood I wish to emphasize now that I am not opposed to Freeways. I believe that they are a valuable part of a transportation system for Chicago as well as for any other city and are as important as arterial streets and mass transportation. What I do oppose, however, is the disregard for Chicago's foundations that is showing up in some quarters where planning is being done. What value is an imposing facade if within—ugly little termites are eating away at the foundations?

It seems to me that too much effort here and elsewhere is being made to show why we can't afford not to have an extensive freeway system. The millions of dollars that are estimated to be saved show fine on bar charts—but unfortunately no one shows the losses caused by not doing some of the unglamorous foundation work. I further believe that the many volumes written that purport to compare arterial streets with Freeways are misleading and not in accord with facts in some key instances.

Arterial streets and Freeways are not comparable. They are similar only in that they both carry vehicles.

To compare Freeway operation with the operation of a facility that forms the backbone of our city and provides access and service to our land areas is subject to question.

Why must we try to prove obvious facts: there are no pedestrian accidents on a facility where there are no pedestrians; no right angle collisions where there are no right angle movements; and where there are no stop and go lights and no parking and no driveways, speeds will be better most of the time? But the computers roll merrily on grinding out more and more of this type of material.

User-Benefit Analysis

Some planners insist that a user-benefit analysis that shows great savings proves that we cannot afford to be without a certain facility. We can prove that improvements for most major intersections in Chicago are needed with no difficulty at all. Such calculations can provide a means of establishing priorities and for propaganda for an increase in taxes, but are of little value otherwise.

After we have determined that we can't be without "whatever it is" there are a few other facts that need careful consideration. First, where does the money come from to do the job—do we drop some of our work around the foundations or do we increase taxes? Second, how do we remove all of the homes and factories from the path of our improvement?

Family Relocations

Here in Chicago we haven't really been involved in any great amount of family relocations with our present expressway system—the routes have been alongside railroads and through worn out areas to a high degree. The unconcern of highway authorities, at the Federal level particularly in spoiling the continuity of our urban area is, we hope, subject to a change for the better. Dead-ending of local streets and walkways and disturbing mass transit facilities for our Chicago residents cannot continue if Chicago is to exist as a cohesive unit.

I have had Freeway enthusiasts tell me that without an expanded network of Freeways we would not be able to compete with other large urban areas because speed of travel is so important. I believe that the compactness of our city is one of our great assets. Our concentration of cultural centers, of banking and of commerce should be maintained.

Here are a few statistics that will provide a better understanding of Chicago's traffic situation. There are about a million vehicles registered in Chicago and 350,000 come in from the suburbs each day. These vehicles operate about 20,000,000 vehicle-miles on a typical work day. About 3,000,000 of these

Arterial Streets

e traffic flow on preferential streets.

miles are on expressways and about five and a half million of them will be when the initial system of expressways is completed. Fifteen million of the vehicle miles are on the major or preferential streets and 2,000,000 on local residential streets. The total vehicle miles in the metropolitan area is around 35,000,000 daily. At the time of maximum movement there are about 325,000 vehicles moving in Chicago's streets. The major street network is, in general, a grid system with major streets at half-mile intervals. The most continuous are the streets spaced at one-mile intervals. Traffic signals are spaced generally at quarter-mile points so a progressive speed of twenty-eight to thirty miles an hour in the four directions is possible. Diagonal streets occasionally spoil this progression, and in some of these cases simple low-cost grade separations are in place or under construction. These will reduce the effect of this complication.

The daytime population of Chicago's central business district is around 850,000 persons. About 350,000 of these enter between 7 a.m. and 9 a.m.—eighty per cent by mass transportation. City-owned parking facilities in the central business district accommodate 6,700 cars and private facilities another 40,000. The area is the terminus of most of the expressways now under construction and is served by the Outer Drive. This, by the way, was the first such road of expressway characteristics and has been serving as many as 140,000 motorists daily for 25 years.

In 1950 a report that made recommendations for improving traffic in the central business district was developed by a special committee appointed by the Mayor. This report recommended a system of one-way streets, exclusive bus lanes, stricter curb controls and the separation of pedestrians and vehicles. In accord with these recommendations a complete system of east and west one-way streets has been effectively operating for several years and a transit lane on one of the Loop streets is giving excellent service.

The separation of pedestrians and vehicles is not yet done but this must come soon. In the last few years all but a tiny fraction of the major streets have been equipped with modern lighting and almost all of the residential sections are relighted. Traffic deaths fell from a high of 986 in 1934 to less than 300 in 1960. There has been a reduction in deaths each year for the last eight consecutive years. All of this has been achieved without major changes in our street system.

A plan for the central business district has been prepared. Plans are under way on government centers and more high-rise buildings along the river and Lake front. The development of a new section east of Michigan Avenue has begun.

This great show of strength by our central area coupled with the entire metropolitan growth provides us with an intensely exciting field in which to work. Those of us responsible for providing the best and more practical transportation system for this dynamic area have before us a very pleasurable and gratifying career.

Unfortunately, Chicago like most urban areas grew with too little planning. While great park systems, forest preserves and a marvelous lake front are among our assets in Chicago, all provided by far-thinking men, we also have problems they left with us. We have offset streets creating miserable jogs; there are diagonal streets that meet two other streets to create six-legged intersections; we have streets that are not continuous and vary in right-of-way width, and we have business streets that become residential streets in an adjoining suburb.

A most serious situation is the varying types of frontage and the lack of proper building setback.

Most cities including Chicago, are faced with the task of preserving this hodgepodge which can't possibly be thrown away because of the impossible replacement cost. Many have advocated that this be done, however, and are waiting until they can afford to do so. Consequently, many cities have made little or no progress toward reducing stagnation.

Chicago was among the earliest of the cities to come to grips with the fact that a city must make use of serviceable things that can be adapted for today's uses.

Most cities, including Chicago, cannot afford to throw away last year's streets just because they are not quite in style.

We can't throw away anything that can be made to work. It is time, it seems to me, to start thinking realistically in regard to our urban transportation system; time for highway planners to stop trying to build rural highways in cities and to start developing urban roadways that are practical and economically feasible.

Chicago does not intend to make radical departures from her rectilinear street system. We shall adjust the alignment of major streets and rebuild them to make them compatible where necessary but they will continue to be the foundation of our traffic plan. Mass transportation will continue to hold a prominent place in moving people between home and work. Expressways are and will be important links in the traffic system. Mass transit in the form of rail service or bus service will be incorporated on expressways where justified.

As the struggle to undo our transportation tangle has progressed through the years we have concluded that major limited access highways are not the cure-all. Even if they were we don't feel that we can afford to sit back and wait for this solution. It is evident to us that regardless of these highways the amount of traffic that must be served by major streets is and will continue to be substantial.

We believe that normal city circulation traffic not served by expressways will demand improvements to our major street system and in providing facilities for this movement we can arrange to handle some of the so-called through-movement with little additional cost.

The service provided by these major streets can be attractive and proper for most urban traffic. With the limited amount of highway money available we hope to improve service for as many vehicle miles as possible in the shortest time with a minimum disruption to the dense urban area.

The value of relatively small improvements to surface streets is immediately realized. These major streets will need

(continued on next page)

(continued from page 7)

reconstruction not only to serve the urban traffic load but also to eliminate any depreciating effct they might have on abutting property.

Reorientation of Traffic

We have uneconomical strip commercial developments, we have badly planned areas and we have incompatible land uses, and above all we have a street system of 3,700 miles that has to be used, insofar as possible, to provide traffic ways for street traffic today and tomorrow. Many square miles of the city have worn out. A lot of it is along major streets. The miles of strip commercial development should get intensive study. Why not a reorientation of traffic using traffic renewal as an aid to urban renewal? If we could buy a block-wide strip along some of our major streets that have deteriorated frontages, we could provide a new kind of development that would fit with a new street and this in turn would tone up the interior community and strengthen it. Let us suppose that we could build a new street not much different than some we now have but screened from bordering property. Service drives could serve the frontage. This is an exciting approach. Equally as exciting are the possibilities for renewing some of our great shopping centers—ring roads and two level streets have a place in rebuilding them. The proposals for improving the Central Business District include such plans.

Traffic planning is one of the keys to the redevolpment of the worn out areas and to the conservation of those that are merely tired. Close cooperation with the Department of City Planning and urban renewal agencies has resulted in plans that are reasonable and possible of accomplishment. The various urban renewal agencies, through the Planning Department, are furnished a traffic report as one of the first steps in planning an area. Proposed street widths are given for the streets to remain, traffic volumes are estimated and streets possible of closing are listed. Information about probable future expressways and the effect of these on the area is provided.

Workable Design

Using this as a guide, preliminary plans are developed and then through joint effort a workable design is made ready. Street improvements and changes are scheduled for construction to fit the redevelopment schedule. This may include the complete reconstruction of one street to provide sufficient capacity so another can be closed or it might involve the shift of a street to a new alignment. A number of streets are being reconstructed to designs that will better fit the rebuilt area as well as carry traffic far more efficiently. A preferential street system made up of a grid network of interconnected trafficways which now carry, or should be improved to carry, intercommunity traffic within the city and between Chicago and adjacent communities has been developed. The preferential street system connects neighborhoods in Chicago, provides circulation between neighborhoods, and serves as a basis for development and redevelopment of neighborhoods. The streets making up this grid are primarily the north-south and east-west one-mile and one-half-mile thoroughfares.

Where feasible, the preferential streets connect with state and county routes at the city limits. The network of preferential streets provides a basis for transportation planning and it serves as a guide for agencies that revise, improve, and provide trafficways. This plan was developed by the Bureau of Street Traffic and the Chicago Plan Commission early in 1950. The alignment of preferential streets is sometimes changed slightly to make them fit a development. However, in those cases the realignment must provide service as adequate as the original.

We hope to develop the preferential street system to its necessary standards through a series of stages, based on a priority system, as finances and opportunity permit. The stages are: 1. Treatment of intersections by channelization, throat widening, and grade separations as conditions warrant. 2. Provision of proper geometrics for safety and capacity within existing right-of-way. 3. Acquisition of additional right-of-way through building set-backs and redevelopment to provide additional capacity where necessary. 4. Construction of new preferential streets of high engineering standards in ultimate right-of-way.

Wherever possible, the improvements made in the existing right-of-way will be designed so that they will apply after the ultimate right-of-way is acquired. About 800 miles of our 3,700 miles of streets are of this category. Traffic volumes vary from about 15,000 vehicles a day to over 40,000. Roughly 300 miles of the preferential mileage is destined to be developed to major standards with frequent grade separations and in some cases service drives. These streets will have design capacities up to 45,000 vehicles a day. Most of them will be de-

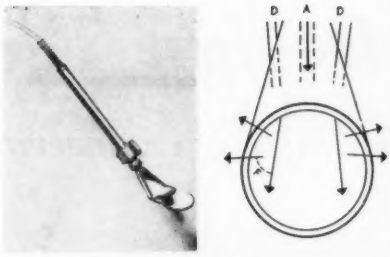
(continued on page 19)

Dental Mirror Utilizes Aerodynamic Principles

Instrument invented by V. S. Piscitelli, B.S., D.D.S., LaSalle, Ill. and developed with cooperation of Acme Model Works, Inc., Chicago, Ill.

An exceptional example of the application of aerodynamic principles in found in a "vacuum dental mirror" recently introduced after being clinically demonstrated and tested in evaluation use by dentists and clinics for the past two years. Those who have followed the expanding programs of engineering groups in cooperating with the medical profession in development of clinical equipment should find it of interest.

Design of the mirror is exceptionally effective in protecting the surface of the mirror under all operating conditions in the oral cavity when used in conjunction with water-cooled ultra-high speed handpieces. Proper aerodynamic principles are employed so that the instrument creates its own vacuum away from the mirror, when attached to compressor air line.



Sta-Dry mirror provides a shield of air which is effective in protecting surface under all operating conditions.

In diagram A indicates compressed air; D—vacuum openings (intake) and F — clean, dry air.

Use of the principles of the venturi increase the velocity of the air that passes through the nozzle in order to develop a pressure differential in accordance with the principles developed by Bernouli. The location of this vacuum condition is dependent in part upon the placement of the nozzle relative to the mirror face. In general the (Stay Dry) mirror affords a shield of air which is effective in providing clear reflecting action during dental operations in a manner not possible with conventional instruments. Placing the nozzle close to the edge of the mirror draws air from beneath the mirror by eliminating vacuum areas which might otherwise permit some materials to be dropped on the mirror.

Conduit or duct is also provided for drawing the air from beneath and behind the mirror in this manner.

The new instrument was invented by V. J. Piscitelli, B.S., D.D.S. of La Salle, Ill. and (in close coordination with the principles worked out by Dr. Piscitelli) developed by Acme Model Works, Inc. of Chicago, who also handle production of the mirror.

Among other instruments in the medical field in which Acme has acted coordinately are: An oxygenator, tissue culture chamber, forceps for forming pipettes which release contents on a time and measured basis and radium applicators. Acme has also designed and built a range of industrial, food processing and communications equipment.

Panoramic Design Technique

. . . makes big cut in drafting, engineering costs

Drawing boards are conspicuously missing in this engineering room at T A B Engineers, Inc., Chicago, where the Panoramic Design Technique is shown in action. Engineer at left is discussing proposed design on blackboard with supervisors at table. At right, two more engineers are checking specifications against the designs on the rear board. Engineer at camera is preparing to photograph a blackboard design for a permanent record. By using blackboards instead of drawing boards, T A B says the Panoramic Design Technique can cut engineering and drafting costs drastically.

A new engineering method which cuts engineering, design and drafting costs immeasurably was unveiled last month by T A B Engineers, Inc., Chicago consulting engineering firm.

The Panoramic Design Technique does away with drawings made by using conventional drawing boards, parallels, and T-squares. Instead, engineers now put their designs directly on wall-size blackboards and record them photographically at T A B Engineers.

With the T A B method the engineers and designers work together as a group at a huge blackboard. Each man is assigned a specific part of the design to develop, and his ideas are constantly on display as he progresses.

The director of engineering or project manager can see the project in its entirety instead of inspecting individual drawings one at a time. If a change is indicated, it can be made just by erasing the chalk and sketching a new version.

The change in the engineers' efficiency is impressive. By seeing how his portion of the design fits the whole pattern, he is stimulated to work better himself. And he can frequently help his fellow engineers on the board by suggesting improvements for their phase of the project.

While the technique sounds simple, in actual practice it takes considerable skill to conduct properly. Getting the engineers and designers to accept the new method and acquire the proper new habits is one of the biggest challenges.

By sketching the basic design on the blackboard full-size or larger — sometimes difficult or impossible to do on drawing paper — the engineer can visualize the design more easily. He can also see how its component parts fit together. This in turn speeds the process of creative design.

When a satisfactory design is developed, a detailed drawing can be made immediately by the use of a plastic overlay which is already ruled and on which the engineer can sketch the other views and add dimensions.

Instead of transferring this work to a drawing board, photographs are taken of the design.

When first experiments were made with this technique, it was planned to make blue-print size enlargements of the photographic print but it was found that the people in the shop could read the dimensions right off the standard pocket-size print.

In fact, they preferred using the small print, since they no longer had to find space to unroll a stack of large drawings, and they could carry the complete assembly and detail drawings in a shirt

T A B Engineers was founded in 1947 by Clifford E. Evanson and William S. Gilbert. The initials stand for Technical-Automation-Business. Mr. Evanson, president and general manager, is a graduate of the Illinois Institute of Technology and a member of the Western Society of Engineers. He is a registered professional engineer.

Mr. Gilbert, executive vice president and director of engineering is a graduate of the University of Illinois and a registered professional engineer.

Each was active for some years with consulting engineering firms before joining hands to organize T A B.

Illustration on the cover shows Harvey A. Edmonds, vice president and director of engineering, as he explains to visitors the new panoramic design technique, used in this instance to develop a high speed packaging machine.

pocket. Similarly, the engineer and foreman on the job site could conveniently use these pocket-size prints for reference. Bulky rolls of drawings were eliminated along with the practice of running back and forth between the job and the construction office where the prints were laid out.

The requirements for the Panoramic Design Technique are wall size blackboards, drawing instruments made for blackboard use, photographic equipment, and the patience and skill to make the change from conventional engineering and design methods.

T A B's own engineering rooms have blackboard surfaces covering eight entire walls.

Transmits Waybills for 100-Car Train in 10 Minutes

New high speed video facsimile communications equipment, developed by A. B. Dick Company for the Denver & Rio Grande Railroad System can transmit waybills representing a 100-car train from an outlying freight yard to the central computer center in approximately 10 minutes. It would take more than six hours to transmit it by prior wire photo or facsimile techniques.

The equipment uses the Videograph process to reproduce, over a microwave communications system, copies of waybills and other documents at local or distant stations. It can reproduce the contents of an 8½ inch wide paper of any length from 5½ to 17 inches in cut sheets form in the same size as the input at a maximum rate of 6 seconds per copy.

The equipment scans, transmits and reproduces documents over wideband video. "The printer uses an electrostatic printing tube to image dielectrically coated paper which may then be developed and fixed by conventional techniques. The scanner employs a mechanical, optical system to produce the video signal representing the original document. Operating speeds are limited by the video bandpass of the communications system and are presently capable of transmitting 8½ inches wide by up to 17 inches long in six seconds."

Michigan Terrace Apartments Will Have Fall-out Shelter

A unique skyscraper apartment building, announced recently by Ralph W. Applegate, president of Michigan Terrace Corp., will be located at the northeast corner of Michigan Avenue at Grand Avenue.

Two Features

The 35 story "Michigan Terrace" project will provide residents of its 480 apartments two unique features:

Its lower parking level will incorporate a fall-out shelter designed according to specifications of the Chicago Civil Defense Corps, to be stocked with food, water and sleeping equipment. The shelter will have its own, separate lighting and ventilating power and communications system, decontamination area, medical and recreational sections, chemical waste disposal and underground water tanks.

Its penthouse level will house the world's tallest-above-ground swimming pool, glass-enclosed and surrounded by outdoor terraces.

The building will be centrally air conditioned, with a landscaped plaza and reflecting pools fronting on Michigan Avenue.

The Michigan Avenue level, atop two parking and service floors which will be entered from Grand Avenue, will house a restaurant, commissary, valet, beauty salon, barber shop and florist. The second floor above Michigan will have some 10,000 square feet of office space, already rented to business and professional firms. The next 30 floors will house 480 apartments.

COAL'S PLACE

In the Future Energy Market

The Noon Luncheon Sessions and General Meetings of Western Society have been offering programs featuring outstanding speakers on a wide variety of subjects of vital interest in technical, administrative, social and many other fields. These have attracted fine attendance and the comments of those present prompt us to, where possible, publish the transcript or a summary of these talks.

The talk presented here was given at the Noon Luncheon of September 13th by Mr. Julian Tobey, Jr., Secretary and Manager — Midwest Coal Producers Institute, Inc., Chicago, Ill.

The Coal Industry today is far from a dying industry. It is in fact perhaps more vital than it has ever been in its entire history which spans some 150 years in this country. What part will the Coal Industry play in the future energy market in the United States, and what are the nation's energy requirements?

The energy requirements that we can foresee, are fantastic. For example, we used in the year 1957 the equivalent of a billion six hundred thousand tons of coal in energy. Now this takes in all forms of energy, coal, petroleum, natural gas, and hydro electric. The Edison Electric Institute appointed three task forces to investigate the energy required in the year 2000, and they all came up with the same answer, working independently. Mr. Phillip Sporn, President of the American Electric Power System has also either made this estimate on his own or adopted it as it is. By the year 2000 we will need about 150% more than that used in 1957 or about 4 billion tons of coal equivalent. Electric Utility requirements for example will approach the entire demand for energy of all types in this country in 1957.

Future Sources

Where do we expect to get these energy resources? In 1957 coal supplied about 27% of all of the energy required to the United States. The estimate for the year 2000 brings coal up to about 30%. Petroleum provided 41% in 1957; This will probably decline to about 31% in the year 2000. Natural gas had supplied about 28% in 1957. This again will decline by the year 2000 to about 16%. Hydro power represents now about 4%. This will decline to about 2%. We have virtually exhausted the hydro electric sites in this country now. Of course, by the year 2000 it is anticipated that a new form of energy will be making itself felt. Actually it is being felt now. Nuclear energy should supply possibly 21% of our requirement in the year 2000. For the coal industry, projected energy demand for the year 2000 means that we should be producing approximately a billion tons of coal per year.

Production Records

The highest production we have had in the past was during the war years something around 632 or 647 million tons per year. We are operating now barely over the 400 million ton level—410-412 million ton. We will have to more than double our capacity in the next 40 years.

The coal industry has suffered considerable loss of market in the past. We have lost within the past 15 or 20 years over 50% of our total market. We lost about 100 million tons of the domestic market. We lost the railroad-locomotive market — perhaps 135 million tons per year. We have recovered from these losses. We are still producing coal at about the same level we were producing it when we had these markets, due largely to the fact that we have been blessed with growing markets for coal.

The electric utility industry has been the major growing market. The industrial market has continued to grow. Other markets, such as steel have continued to grow. Now along with these growing markets why have we gotten more perhaps than our share of them than other energy sources? It is mainly because the coal industry has grown with the market. We have had increased mechanization in the mine. This, of course, has resulted in a reduction in the labor force. This is extremely important in these days when labor costs in almost any industry are perhaps the major single item of cost. The production increase resulting from this increased mechanization has been outstanding in industry in general. The equipment used in a modern strip mine today almost defies the imagination. If you haven't seen it, then it's something worth seeing. Huge shovels remove overburden, rock and dirt lying above the coal seam. If you placed one of those big shovels in the middle of the Ohio State Stadium it could reach around and take a bite out of any part of it clear up to the top level. At the same time this coal mined and strip mined, was hauled in trucks—45 tons is a small truck today in capacity. One large mining company is developing a 150 ton hauling truck. In one truck moving at 40 miles an hour on level grade they will haul the equivalent of 3 railroad cars of coal.

Underground coal mines are using more and more continuous mining equipment. No longer is the industry limited

to the conventional cycle of cutting, drilling, shooting and loading.

There are huge machines that just claw their way through the coal seam and spew the coal out of the rear end to shuttle cars or whatever method of transportation is used.

There is even under development a robot mining system. The robot miner bores its way into a hillside and by use of radar and other electronic devices follows the coal seam, loads the coal cars, and sends them back out.

Robot Miner

One man can sit outside and operate this whole system. These are some of the reasons why the coal industry today is in a position to take its place in meeting the demands for future energy requirements in this country.

It is well to look at the magnitude of the job ahead for the coal industry. Perhaps the best way to discuss it would be to limit it to our largest growing market —the Electric Utility Industry. Looking at only the growth in the past 10 years, 106 million tons of coal were used by the Electric Utility Industry in 1951 and 170 million tons in 1960. We anticipate that by 1980 680 million tons per year will be required. This amounts, in that roughly 20 year period, to some 8 billion tons of coal for which these customers are going to pay something over 55 billion dollars.

An interesting side line on this which engineers perhaps would be more interested in than other people is the picture which has resulted in improvement and efficiency in the use of coal in the Electric Utility Industry. While we are going to get continually larger markets for coal from our friends in the Utility Industry, they at the same time are beating their brains out so that they use less and less coal every year to generate a kilowatthour of electricity. In 1920 in this country it took an average of 3 pounds of coal to generate a kilowatthour of electricity. In 1951 this figure was down to 1.14 pounds per kilowatthour. In 1960 the average was down to .88. The most efficient station in 1960, the Clinch River Station of the American Electric Power Company generated a kilowatthour of electricity with 7 tenths of a pound of coal per kilowatthour.

We get into an area of some speculation here as to how far this improvement can continue. We have done a lot of work in attempting to evaluate this. We have to know this in order to project our future market. The new stations being built today, the so called super-critical stations, are being built at specifications of about 3500 pound pressure, about 1050° Fahrenheit temperature. Now the coal rate or the heat rate in the Electric Utility Industry in general is going to decline over the next 10 years on the average as new stations replace old stations. However, we don't expect to see a significant break-through in this efficiency barrier until there have been major break-throughs in metallurgical research.

What we have to look at now is that there will be a tremendous demand for energy in the coming four decades. How can the coal industry supply its share of the demand? To put this problem down into perhaps a simple form, let's look at a single coal company which is supplying electric utilities with let's say—2,400,000 tons of coal per year. By 1980 this company will have supplied to these utilities 125,000,000 tons of coal. Now this presents some problems, 125,000,000 tons of coal is a lot of coal. It represents more coal than that in the ground because we unfortunately do not get 100% recovery, so we have the problem of where this hypothetical company is going to acquire reserves of suitable coal for this purpose. They aren't going to sign a contract with a coal company to supply 125,000,000 tons of coal if it can't show them they've got the coal. Many utility contracts today actually include what we call dedication reserve clauses. The company wants to know, if I'm going to sign this contract: "Where is my coal?" "I want to know what acreage it's under down there and you have to guarantee me that that's my coal and it will be there for me when I need it." In supplying these huge quantities, we are getting away from the concept of month to month buying and selling; we're getting into the long term contract concept. There are a number of things involved in this. We've got problems of improved transportation to worry about, we've got to cut down the turn-around time on empty coal cars, we perhaps have to go into a great many things with our railroads that will cut down both cost and time elements. We've got to develop for example single contracts with our customers that cover both the fuel and transportation charges. This cannot be done under our present Interstate Commerce Commission regulation. We cannot expect a customer to sign a 25 to 50 year contract when only one element in the thing is fixed as far as cost is concerned, so eventually we're going to have to get a package deal on these contracts, which is going to require a change in the laws that exist today.

There are concepts of so-called integrated trains, which instead of using the conventional equipment of the railroad would be a special train that did nothing but shuttle back and forth to supply coal to a given plant. We are going more and more to the single purpose coal mine. Here is a plant that needs a million tons a year, we build a coal mine to supply a million tons a year. We are getting away from the multi-purpose mine where you may have to shut down your whole preparation plant maybe every 45 minutes to change sizes, change screens, make a new size, load a half dozen cars—all of this adds to cost.

Another factor of course, has been in the picture for quite a while—the effort to locate our major electric utility plants near the source of coal, preferably right on top of the coal mine. A mine mouth plant is an ideal situation. There we get away from the transportation problem. Of course the problem in this respect is that where mines are located is not where consumers of electricity are located. This problem is being bridged by research into high voltage transmission, 345,000 volts is not uncommon now. We have transmitted electricity 100 to 120 miles economically by locating our plant at the mine mouth and employing high voltage transmission. On an average in this country taking into consideration all coal freight rates and so forth, this proposition can be extended economically to approximately 300 miles. Research being done today on 720,000 volts transmission will in time extend the range of high voltage transmission, and make more attractive locations of plants at the mine mouth.

Now no particular industry, unless it enjoys a monopoly, can look to the future without considering what the com-

(continued on next page)

Coal's Place In the Future Energy Market

(continued from page 13)

petitive situation will be. Most of you realize coal has competition from such things as gas and oil. We recognize this, we find that even though we turn our backs on it sometimes it doesn't go away. We have perhaps one big advantage over our competitors in the general fossil fuel field and that is in the reserve picture. Their reserves are somewhat limited compared to ours, where you measure life index in terms of 20 years we talk about 1900 years supply of coal in the ground in this country. Even being extremely conservative and eliminating 50% of this on the basis that it is perhaps not mineable, we're still talking about 900 years. We're talking about several hundred years at present cost levels, so we have a great advantage over our competitors in the fossil fuel field from a reserve standpoint.

Perhaps more interesting than this fossil fuel situation is the picture of nuclear energy. All of you remember after the first bomb was exploded, the newspaper speculating that within a very few years a few teaspoons full of atomic energy of some type were going to power New York City for fourteen years without replenishment and you know this did not come about. However, there has been continuous development in the nuclear field. You cannot put the time, the money, the manpower, the brains into a problem such as this on the scale that we have done it in the country if there is any feasibility in it at all without coming through with some breakthrough in the thing, and we have had some very significant breakthroughs in the nuclear field. The first application, of course, of nuclear energy for the generation of power will come in those areas far removed from fossil fuel sources, where the transportation charges are high. Perhaps I should have said the first application will come where we have seen it come in the military and where cost is not a factor.

Reactors have been developed on an experimental scale that will generate electricity. Technologically it is thoroughly feasible and fairly practical. Our friends at Commonwealth Edison have a station operating at Dresden on atomic energy and there is nothing impractical about it at all.

The economics are a little different story. We in the coal industry are not inclined to worry too much about atomic energy from the standpoint of this form of energy taking our business away from us. We are fully cognizant of the fact that this form of energy is going to take its place in the overall picture in the years to come. From an economic standpoint we enjoy a pretty satisfactory situation now. The average new coal fired plant, built since 1950, will produce power at a fuel cost of under 3 mils per kilowatthour. The electric energy plant at Joppa down State has a fuel cost of 1.83 mils per kilowatthour. The Will County Station of Commonwealth Edison 2.7 mils. This is higher than Joppa mainly because the transportation charges are higher, moving coal up to Will County.

Fuel cost at Dresden is in the neighborhood of 8 mils. Pacific Gas and Electric Company proposes to install a new plant. They consider it an advanced development in nuclear reactors. They expect to have 5.32 mils per kilowatthour cost which compares with their present cost on gas and oil of 5.77 mils. These figures are not 100% correct, for the simple reason that there has been a great deal of money invested in research, in development, in this field. All of these costs are not included in the operating costs as they are presented to us, and perhaps the exclusion is legitimate. When we get on a downright hard competitive situation we scream foul on this, but I will concede that there is a chance that there is some legitimacy to it. Next is the fuel cost. Atomic fuels are still subsidized by the United States Government. What is the cost of the charge of nuclear material necessary to operate the Dresden Station for example. As far as Commonwealth Edison is concerned it is the "use charge" they have to pay for it to the Atomic Energy Commission, it doesn't represent true cost. We don't know what's going to happen to that picture in the future. We think they still have some problems in the disposal of radioactive waste from these plants.

We go a little further in looking perhaps to what we choose to call the exotic cells, and magneto hydro dynamics. These are all energy resources, and they all will have a place in the energy picture in this country. The newspaper men find there is a lot to write about in some of these things. They envision for example the fuel cell developed to the state that you go down to the corner supermarket and buy a little black box which you put in your basement and this provides all of your electric energy for the coming year. This is wonderful except it has some serious drawbacks to it. Probably that little black box would cost you too much, but one thing to bear in mind is none of these things are going to put our friends in the utility business out of business, and for one very significant reason. If you need a 100 kilowatt capacity in your home, and you're going to get it in your own private little black box, you have to buy a black box with 100 killowatts of capacity. When you buy your power from the electric company perhaps they may only have to install 10 kilowatts of capacity to take care of your 100 kilowatts of demand, this is due to a diversity factor. They've got a wide variety of loads, they don't all come on the system at the same time or to the same degree. Perhaps any of these exotic fuels or energy sources that are developed will perhaps have to be developed for central station use. To conclude, and I should conclude here, I'll just summarize by saying that we have in this country a tremendous growing demand for energy, despite the fact that the coal industry has had many difficulties in the past, we've lost markets, we've had labor problems, we are growing to meet this demand. The non-fossil fuels, nuclear energy, the exotic energy sources will certainly take their place in the whole energy picture in this country. For at least the next four decades to the year 2000 we see the fossil fuels predominating in the energy picture, and we see coal, of course, as the predominant fossil fuel.

This article is presented to implement the intent of the Jackling bequest to the Western Society of Engineers.

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Paving Control System Assures Smooth Mats

A new control system said to enable road pavers to lay perfectly smooth mats automatically, regardless of rough or irregular roadbeds, has been developed by Minneapolis-Honeywell.

Use of the control system enables contractors to accurately determine mix requirements ahead of time for more exact cost estimates. It also means contractors can do high-speed paving without being forced to tear up unacceptable bumpy stretches, he continued. It can be used with either concrete or asphalt paving materials.

Used on New or Existing Pavers

The control system can be installed on new pavers and retrofitted on used models.

More than 10 years ago Honeywell engineers devised precision controls so tanks could continue firing on targets while lurching over rough terrain at full speed. In developing the paver control system, they added electronic refinements based on Honeywell control systems designed for missiles and satellites. They came up with an electronic "brain" that automatically controls the paver screen to lay a smooth asphalt mat.

The system is so sensitive it will detect a dime laid down on the road. It is so flexible that if the paver goes over a 4-inch railroad tie the only sign of the tie will be a 1/32-inch ridge in the first course—and the next mat will completely cover even that.

Because the control system works from an outside reference line, it does not depend on paver wheelbase or speed to lay a smooth road surface. The reference line can be a piece of cord stretched between stakes down the center of a new road, an existing pavement, or a long "ski" riding over a subcourse.

Setting the paver control is extremely simple. Using the control knobs, the operator dials slope and grade corrections, then snaps two switches to "automatic" and the control takes over.

Once set, the control maintains crown angle and grade, laying a smooth course regardless of grade angle.

Basically, the paver control consists of six components: a command panel, pendulum, grade sensor, control box and two servo motors or hydraulic pistons, one on each side of the paver. The command panel, sensor and pedulum feed electrical signals based on desired and existing grade and slope into the control box.

Using this data, the control box electronically controls the servo motors or hydraulic pistons to vary the screed attack angle, automatically conmpensating for any road irregularities.

A dial on the command panel sets the desired slope. Indicators show any deviation from the required slope and grade and show system performance at a glance. Once the grade and slope are set, operation is entirely automatic.

By smply touching a toggle, operation of either or both sides can be switched from automatic to manual operation. (In manual control the operator varies screed angle by manipulating switches.)

The Honeywell control system does not interfere with mechanical paver control. Screed angle can be regulated automatically, manually using electric switches on the Honeywell control, or mechanically using the hand-wheel method as a manual override for driveways and close work.

New Instrument Pen Design Eliminates Moisture Problem

A new marking system which can be installed in place of other systems in ten minutes is announced by the Esterbrook Pen Co., 200 Cooper St., Camden 1, N. J. It is especially adapted to industrial circular chart recorders and meters.

The "Mark-Trol" kit consists of one stylus (4 sizes available), capillary tubing, universal adapter, cartridge holder, mounting bracket, pressure sensitive tape and 4 plastic ink cartridges in a choice of 5 colors.

The capillary system eliminates the problems of dust, dirt and moisture. Ample ink supply in cartridge indefinitely extends change cycle from days to months.

U of I May Again Offer Refresher Course In Structural Engineering

A few years ago the University of Illinois—Division of Extension—offered a refresher course in structural engineering to prepare candidates for taking the examination to become a registered structural engineers in Illinois. Recent inquiries as to the possibility of this course being given again suggest that interest may be widespread enough to justify making it available.

These courses would be conducted by the staff from the College of Engineering in much the same way as the refresher given for the Professional Engineering License. They would be divided into eleven subject headings and attempt to set forth the important subject headings anticipated as part of the examination.

In general, subject matter areas covered would be general engineering knowledge, reinforced concrete, steel structures and wood masonry and foundations. It would be brought, up-to-date with the essential new techniques that have evolved during the last several years.

To cooperate in determining whether there is sufficient interest to justify presenting this course again we invite inquiries to be directed to MIDWEST ENGINEER, 84 East Randolph St., Chicago 1, Ill.—Phone RAndolph 6-1736.

If offered, the course would start sometime after January 1 in line with the second semester of the standard University calendar.

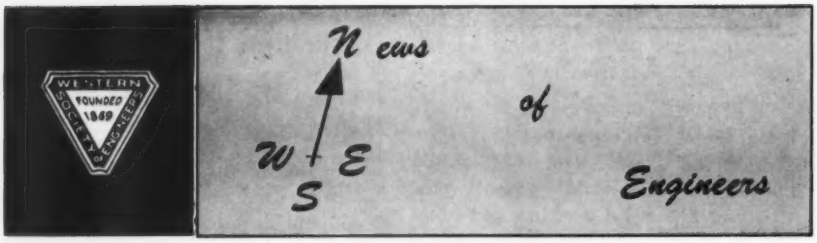
Issue 4th Edition of Highway Booklet

The fourth edition of "The Highway Transportation Story . . . in facts" has been published by the National Highway Users Conference.

The booklet, originally issued in 1952, has since been in great demand.

It points up by charts, graphs, pictures and facts the vital role motor vehicles and highways play in the United States' economic and social life and in its national and civil defense.

Single copies of the new, 44-page edition, which is printed in three colors, can be obtained from the National Highway Users Conference, 966 National Press Building, Washington 4, D. C.



or: Personals of Personable People

Harold Ray Heckendorn, superintendent, manufacturing engineering, Western Electric Company, Columbus, Ohio, has been transferred to the grade of Fellow in the AIEE . . . "for contributions in the engineering of manufacture for the rapidly advancing communications art." After receiving a degree in electrical engineering from Kansas State University in 1934 he was later with the American Telephone Co. and Middle States Utilities. In 1941 he joined Western Electric in Chicago. He moved to Columbus in 1960.

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Howard A. Carter of Carter & Holmquest, Technical Service, received on October 9th, the Award of Merit from the American Academy of Ophthalmology and Otolaryngology for distinguished services in the educational program for the conservation of hearing of the adult.

•

Robert C. Beckwith, Manager-Manufacturing Engineering, Henry Pratt Company of Chicago, announces the appointment of Raymond Kucharchuk, Manufacturing Engineer. Mr. Kucharchuk was formerly with the Ford Motor Company where he served as Plant Industrial Manager of Automotive Industrial Division.

•

Leo Dolkart, a member of the Western Society of Engineers, has been cited by the Chicago Technical Societies Council for its 1961 Merit Award. This award is made annually to distinguished scientists in the Chicago area on the basis of their scientific and technical achievements and their contributions to civic betterment.

Mr. Dolkart has had a 58-year career as an electrical engineer and registered professional engineer. He received his B.S.E.E. degree from the University of Illinois in 1903. One of his first assignments, as an engineer for Automatic Electric Company, involved installation of the first automatic telephone exchange in Chicago.

He is a fellow in the American Institute of Electrical Engineers, and a member emeritus of the Illuminating Engineering Society. Among his other professional affiliations are the Illinois Society of Professional Engineers, and the Society of American Military Engineers.

Born in Caucasia in 1881, he writes and lectures extensively on the ancient history (4500 B.C.) of Caucasia. He also is the news editor of the "Sci-entech News", official publication of the Chicago Technical Societies Council.

•

De Leuw, Cather & Company announce that Vice Admiral W. Orme Hiltabidle, Civil Engineer Corps, United States Navy (Ret'd.), formerly Vice President of Chas. H. Tompkins Co., has joined their organization as Consultant, with offices at 1308 Eighteenth Street, Northwest, Washington 6, D. C.

•

Clinton O. Willson, superintendent of metering for Commonwealth Edison Company, retired October 1 after more than 35 years with the utility. In 1926 he started with the construction department as an electrician and later became safety supervisor. In 1946 he was made superintendent of the merged meter and service and meter departments and ten years later was named superintendent of metering. He has worked at the utility's technical center in Maywood since 1958. During World War I Mr. Willson served with the U. S. Army Engineers in France, England and Russia. He is past commander of the Commonwealth Edison Post of the American Legion and a member of the Western Society of Engineers.

•

Nick Hernandez, design engineer for **Harza Engineering Company** International, was recently honored by King Hussein of Jordan with a gift of two gold wrist watches, the second watch being for Hernandez's son, born in 1960 in Jordan.

Hernandez has completed two years work on the East Ghor Irrigation Project of the East Ghor Canal Authority, and the gift from the King was in recognition of that service. Hernandez is returning to Harza's Chicago office for re-assignment. The East Ghor project now in progress is an initial step in the Master Plan for development of Jordan's water resources prepared jointly by Harza and Michael Baker, Jr., Inc., of Rochester, Pa.

•

Last September **A. Epstein & Sons, Inc.,** Chicago, received First Prize Award of Merit in the institutional category of the Exhibit sponsored by the American Institute of Architects and the South Shore Commission. This project was in connection with Faulkner School. Also, Pacifico Bacalozo and Borivoj Rieb, of the Epstein Design Department, received commendation and an award of $500 for their entry in the long range medical facilities competition of the Mastic Tile Division of Ruberoid Company. Epstein's architectural group leader, Ed Paul, recently presented a color slide lecture on the "Oak Park" period of Frank Lloyd Wright in connection with the Annual Art and Music Workshop of the Oak Park Elementary School Department of Unified Arts.

•

Proctor Noyes has joined **Stanley Engineering Company** as Head of the Cleveland office. Noyes, as City Planning Specialist, will direct Stanley Engineering Company's activities in the regional and city planning-urban renewal area in which he has over 40 years of broad experience, including 12 years as a Director of the Regional Planning Commission in Cleveland.

Unclogging Chicago's Arterial Streets

(continued from page 8)

signed for not more than 35,000 vehicles daily.

Much of the preferential street mileage that we intend to develop to the highest standards is already carrying traffic volumes of as much as 35,000 vehicles a day but doing so under considerable pressure. It is estimated that this mileage would not carry materially less traffic if a greatly enlarged limited access highway system were to become available. It is therefore necessary that these major streets be improved and brought up to a level of performance that will reduce pedestrian-vehicle conflict, increase vehicle speeds, cause the minimum amount of damage to abutting property and provide the best possible service to this property.

As urban renewal programs have gone forward, right of way has been set aside that will permit the major streets to be reconstructed. In areas where all new buildings are proposed we request and get 100 feet of right of way for street sections where no access to the property is needed. In other words, 100 feet will be ample for our purpose provided that there are no curb openings except those that will not in any way interfere with traffic movement and provided no curb interference will develop. Where such is not the case, sufficient additional right of way is set aside to permit the installation of service drives.

Street sections of substantial length can now be built to the new standards and we are hopeful that a way will soon be open to us to procure right of way in other areas of the city in an orderly fashion that will not create any unnecessary hardships or disrupt city functions.

Most of the preferential street mileage has already been treated in some manner to improve traffic movement. The improvements consist largely of medians and left turn channelizations. Thousands of miles of lane lines are maintained to achieve more orderly flow. A traffic signal plan which was mentioned earlier is in use which limits signal locations primarily to quarter-mile points to provide a good progressive movement.

Taking an important place in the improvement program is the low cost simple grade separation that provides freely moving through lanes for some of the movements at a complicated intersection so that the capacity here can be made to match that of the adjacent intersections.

Several structures are being designed and one has been completed. The one completed is at Archer and Ashland. The second is under construction at Western-Clybourn-Belmont. A third is being started at Pershing and Ashland. The one now in place has exceeded our expectations and has produced a substantial improvement in traffic efficiency at the intersection it serves. Some movements were doubled in capacity and the overall efficiency is up more than 70 per cent.

One of the major stumbling blocks to the improvement in traffic capacity is the difficulty of solving the problems that occur when a major street passes through a large shopping center. Several plans have been advanced to increase capacity and at the same time improve the shopping center. By applying the principle of the ring roads and by-passing through-traffic, we believe we can achieve a reasonable compromise. All centers are now being studied and it is very likely that some concrete action will begin within a very short time at one large center.

We feel that this phase of our work is extremely urgent in that we must halt the decline of our shopping centers and help them compete with the attractiveness of the suburban plaza. It is of great importance to our city that the commercial establishments within its limits maintain and strengthen their sales records. Because of this and the needed traffic improvements through the areas, we have placed this work at a very high priority.

Among the paramount aims of Chicago's traffic planning is the preservation and enhancing of the economic, cultural and social values of the entire city. It is important that all planning —both highway planning and land planning be aimed toward what is best for Chicago and its tributary area. Local policies must be respected. We therefore feel that modernizing the preferential street system is extremely important in achieving what is best for all.

Reviews of Technical Books

Mine Ventilation and Air Conditioning

Mine Ventilation and Air Conditioning, by Howard L. Hartman, Professor of Mining Engineering, and Head, Department of Mining at Pennsylvania State University. Published by The Ronald Press Co., New York 10, New York. 398 Pages. Price $12.00.

This vital aspect of mining engineering, as applied to underground operations, is very well covered in this book. Air conditioning requirements for human comfort are presented under three prime headings: Quality Control, Quantity Control and Temperature-Humidity Control. Each aspect is thoroughly and carefully covered with regard to the environmental factors under control.

The author's preliminary presentations of the basic concepts of physical chemistry, thermodynamics and fluid mechanics are a great aid to those who are in need of a review in these topics. His familiarity with mining operations and procedures lends a practical approach, with special regard to mining equipment use, and to economies that can be attained by their proper selection.

The analysis and solution to practical problems cover the subject, when topical, throughout the text.

Tables, charts and illustrations are used extensively. There are some well chosen photographs. The appendix is brief, but useful, and the bibliography comprehensively listed. S.W.L.

Circuit Analysis

Circuit Analysis by Elias M. Sabbach, published by The Ronald Press Company, 15 E. 26th St., New York 10, N. Y. Pages 247. Price $8.75.

This book covers material that has been the basis for a sophomore course at Purdue University. The stated objective of the course and the book are to provide a firm foundation for the student of Electrical Engineering.

The book is intended to be studied. The strong point is the continuity that has been "engineered" into the subject. The author has collected and organized the material into headings that follow and supplement each other. A degree of fluency has resulted, which passes over to the reader and should help him to understand and to mentally classify the information.

The first half of the book is concerned with developing a concept of the common circuit elements and their physical characteristics. In this section, the basic explanations and illustrations are given.

The second half of the book is concerned with more complicated functions and new concepts with emphasis on methods of solution.

Throughout this volume there are clear illustrations, that supplement the text, and usually these are very considerately located on the same page as the explanation that they accompany.

Although the text is directed towards the classroom and the student, the book is also well suited as a basic reference due to its systematic arrangement, and the completeness of its its subject matter.

P.R.C.

Mechanical Engineering Experimentation

"Mechanical Engineering Experimentation", by George Lewis Tuve. McGraw-Hill Book Company, Inc., 330 W. 42nd St., New York 36, New York. Pages 516. Price $8.00.

The main stated purpose of Professor Tuve's text is to "provide a comprehensive, self-contained laboratory text book that will conserve the time of the student and his instructor and serve as a ready reference." The author does an admirable job of achieving this objective. The book is organized in four basic parts of: (1) planning, (2) instrumentation, (3) studies of processes and (4) analysis of systems. Part one deals mainly with the organization of experimental work, accuracy of data and, a most important topic, the presentation of results in proper report form. Part two covers the subject of instrumentation for measurement and control relative to variables such as pressure, temperature, mass, volume, radiation, etc. The sections on electro-mechanical measurements and dynamics and automatic control are particularly well covered. Part three of the text studies the properties of fluids and investigates the dynamics of processes from the standpoint of fluid flow, heat transfer and combustion of fuels. Part four deals with practical applications of the other parts to machines and systems. This section covers pumps and compressors, steam power, combustion-engine power, heating, ventilating, air conditioning and refrigeration.

In the presentation of the subject matter, the author makes use of the newer concepts and techniques in mechanical engineering laboratory work. This includes the use of analog methods, automatic controls, digital computers, numerical controls, dimensionless parameters, statistical methods, electro-mechanical tranducers, electronic instrumentation and others. Although the work includes much traditional subject matter, the author has wisely chosen to omit much of the near obsolete older methods and data. The text has a total of 179 tables and charts of useful data. A handy alphabetical index to these charts is located on the inside cover and flyleaf of the book for ready reference.

Although the text was designed as a reference for students, its content would also be a practical guide for the laboratory technician or engineering aide in choice and set-up of instrumentation.

A.J.B.

Engineering Societies Personnel Service, Inc.

Est. 1918

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C-8934 APPLICATION ENGR. Grad. ME age 30-45; Duties: Counsels sales service engrs. on appl. & unit selection problems, taking over the more complex problems, for personal handling when necessary. Direct contact with the field is limited since, in general, this is made thru the sales service engr., but where the nature of a problem is such that it requires repeated discussions with the customer and/or field sales engr., direct contact will be made. Refers problems of unusual nature or complexity to the proposal engrg. mgr. May be called upon from time to time to handle all phases of bridge & dam & similar projects, selecting proper units, developing costs & prices, coordinating devel. of quotations & subsequent follow-up. Report to sales mgr. for a mfr. of power transmission drives, sal. $8/10,000 loc. Chgo., employer will negotiate the fee.

C-8929 ESTIMATOR-DESIGNER Grad. Elect. or equiv. 5+ yrs. in estimating & design of light, power & distribution systems for industrial plants. Previous exper. with elect. contractor desirable, for a contractor sal. $10/14,000 loc. Chgo., employer will pay the fee.

C-8928 PROJECT ENGR. RESEARCH & DEVEL. BSME age to 38; Project engr. on multitude variety of res. & devel. projects involving mech. design of mach'y. applicable to hardboard mfg. Duties incl. some board design (only basic layout-very little detail drwg.) shop liaison with craft personnel & some

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supv. thereof, ordering of mat'l. cost estimates & project proposals, actual shakedown & start up of project designs. Wide variety of projects, for research & devel. on hardboard sal. $8100/8400 loc. Ill., employer will negotiate the fee.

C-8925 (A) INDUSTRIAL ENGR. BSIE-ME with Bus. Admin. Some exper. heavy welding & process plate fabricating. Mfg. feasibility studies on new products, econ. studies for comparing alternate mfg. processes. Some budgetary exper.—heavier on process & mfg. end than standards, sal. $10/12,000 loc. Chgo. area, employer will negotiate the fee.

C-8925 (B) TOOL & EQPT. DESIGNERS (2) Grad. ME heavy in welding—fixtures & mat'l. handling eqpt. Content to do design work—working up proposals detail estimate cost of design. Accept a problem & devel. a solution to it sal. $7200/9600 loc. Chgo. area, employer will negotiate the fee.

C-8843 (A) SECTION HEAD Grad. CE; must have a min. of 10 yrs. proven exper. in design of power houses, tunnels & intake structures. Must have knowl. of fill dams & hydraulic structures. Ability to follow design studies in other depts. req'd. Exper. in client contact essential. (B) EST. & SPEC. WRITER Grad. CE min. 5 yrs. exper.; in large hydro projects. Duties consist of cost estimating, writing & reviewing specs. for a consultant, salaries open dep. on exper., loc. Chgo., employer will pay the fee.

ENGINEERS AVAILABLE

MW: 716 CHEM. ENGR. MS-Chem. Eng. 34; 5 yrs. with consulting firm as project engr. piping, layout, specs., eqpt. & instrument selection, particularly in pharmaceutical field, sal. open, loc. Midwest.

MW: 717 FACTORY MGR-V.P.MFG., ME-Bus. Admin. 50; 15 yrs. as factory mgr. metal products. Know all phases of prod. & mgmt. Wide exper. in solving production problems & increasing output at lower cost. Profit minded & can operate factory at max. efficiency. Sal. $12,000 loc. Midwest pref.

MW: 709 SANITARY ENGR. BS-San. Engrg. Grad. Studies CE 40; P.E. with 18 yrs. exper. in design, construction & operation of sewage & water treatment plants, collection & distribution systems. Also 4 yrs. as part time instructor in Civil & San. Engrg. Will be available for empl. 2/1/62 sal. $12,000, loc. U.S.

MW: 683 CHIEF ENGR. BSCE 46; 23 yrs. cons. office & field exper. in heavy steel construction as bldgs., bridges, ore docks, conveyors, power houses, steel mills & petro-chem. plants. Sal. $12,000 loc. open.

IS IT THE PROPER THING TO DO?

NOTE: This column deals with standards of conduct in the engineering field. The editor invites comments and criticisms on the ethical problems considered herein. Questions submitted on engineering ethics will be given careful attention. You should address your letter: The Editor, Midwest Engineer, 84 E. Randolph St., Chicago 1, Ill.

SITUATION: John Doe and Associates, Engineers, is a partnership of three individuals; Joe Doe, Bill Black and Abe Able, and Joe Doe owns a controlling interest in the partnership. The partnership does only engineering work. However, only Bill Black and Abe Able are registered engineers.

QUESTION: 1. Are Bill Black and Abe Able acting in an appropriate manner by joining in partnership with Joe Doe, who is neither a registered engineer nor a registered architect?

ANSWER: Bill Black and Abe Able are not acting in an appropriate manner. The partnership purports to be a group of engineers qualified to do engineering work. However, the major interest in the partnership is owned by one who is not qualified to do engineering work, namely; Joe Doe. Inasmuch as Bill Black and Abe Able have made Joe Doe a partner, having greater standing in the partnership than either of them, there is an inference that he is at least equal in ability to the other two members of the partnership. Thus, a member of the public may be misled to believe that Joe Doe has the necessary qualifications to perform engineering work. Since the public may be deceived by the partnership, the position which Bill Black and Abe Able have placed Joe Doe in makes their action questionable. Another consideration is that there is a holding out to the public that Joe Doe and Associates are engineers, when in fact all of the partners are not engineers, which on its face is a deception, especially since there is an implication that Joe Doe is an engineer. A further consideration is that by Joe Doe's controlling interest in the partnership, he may override the decisions of the engineers and place the engineers in a compromising position.*

* An opinion of the Panel on Engineering Ethics of the Division on Education and Research of the Western Society of Engineers.

Refrigerant Gases May Aid Water Desalting

The refrigerants used in your air conditioner and refrigerator may play an important role in easing the expected world-wide shortage of potable water, the American Institute of Chemical Engineers was informed at their 45th annual meeting.

Freon-31, Freon-21, ethy bromide, Freon-142B and Freon-12B1 "appear to be useful" in the hydrate process for desalting sea water, Allen J. Barduhn, Howard E. Towlson and Yee-Chien Hu, of the Department of Chemical Engineering and Metallurgy, Syracuse University, reported in a paper, The Properties of Some New Gas Hydrates and Their Use in Demineralizing Sea Water.

The paper was a report on an investigation that was inaugurated in July, 1959 "to determine the critical decomposition temperature and pressure of hydrates not previously reported, to determine more completely the necessary thermodynamic relations for those hydrates that appear promising for use in desalting, and to determine other properties of the systems necessary for an economic evaluation of the process such as composition and rate of formation of the hydrate and solubility of the agent in water."

The paper described the hydrate process as a "comparatively new" one "in which pure water is separated from its solutions in a solid form by a reaction with certain agents to produce a gas hydrate." It was the subject of a recent article in Chemical Engineering Progress which told about the use of propane as a hydrate.

The hydrate process "is quite similar to the freezing process in which a direct contact refrigerant is used, in that heat is removed from salt water by evaporating a refrigerant intimately mixed with it to produce a solid form of water (ice or hydrate) free of salt, which is subsequently separated from adhering brine, and then melted by condensing the compressed refrigerant on it. The hydrate process thus accrues many of the advantages of the freezing process, such as absence of scale formation, very low temperature differences required for heat transfer, absence of membranes, etc. In addition, is has certain advantages over the freezing process mainly due to the fact that it operates at higher temperatures."

Hose Sections Act As "Shock Absorbers" For Pipe Fittings

Short lengths of special rubber hose that act as "shock absorbers" in a modern sewage treatment plant are being used to eliminate the common problem of pipe fittings shaking loose.

At the Sayreville, N. J. treatment plant, the hoses take constant "shocks" from water pressure when pumps activate the purifying chlorination system and from vibration caused by vacuum-type chlorine gas injectors.

Thirty B. F. Goodrich "Flexseal" connectors were installed in the $32,655,000 central treatment plant at Sayreville three years ago, and have given trouble-free service ever since. The connectors appear virtually indestructible and resist damage from highly corrosive chlorine solutions. The plant serves Union and Somerset counties as well as Middlesex and has a design capacity of 78 million gallons per day.

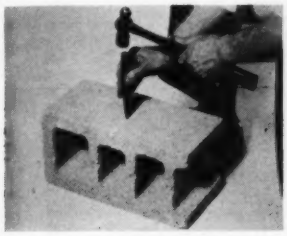
A 10-unit chlorination system sterilizes sewage before it is discharged into nearby Raritan Bay explains Sol Seid, chief engineer for the Middlesex County Sewage Authority. Chlorine gas is mixed with water reclaimed from the sewage and the chlorine solution can be added to raw sewage before plant treatment and again after treatment, before final disposal.

The system is unusual because water reclaimed from sewage is used in the chlorinators instead of tap water, used by most treatment plants, he said. The reclaimed water is pumped to the chlorinators under a pressure of 65 pounds per square inch to form chlorine solution which has to be added to the sewage rate of 54 parts per million.

HOW TO MAKE NEW TEST ON MOISTURE CONTENT OF HARDENED CONCRETE

With the increasing use of concrete block in construction of all types, new test methods have been developed for quality control. One of these is the ASTM test C-427 on the moisture conditions of hardened concrete by the relative humidity method.

To acquaint contractors, engineers and other groups with this new test, a series of three progressive photographs has been prepared, showing how the test is performed.



ASTM Test C-427 is of special interest in view of wide use of concrete blocks in all types of construction.

PHOTO, UPPER LEFT—After the samples have attained laboratory temperature and the apparatus calibrated for accuracy of the hygrometer, the test specimen is broken into two approximately equal portions using a chisel and hammer. One half is marked and stored in a vapor tight container for future tests.

PHOTO, UPPER RIGHT—The remaining portion is broken into lumps or pieces with the largest dimension of any one piece not exceeding 2 inches. The lumps are screened to remove the dust. A ¾ inch opening sieve is used for this procedure. From 10 to 15 pounds of the broken pieces should make up the test specimen.

PHOTO, LOWER RIGHT—The test specimen is placed in the open mesh pail and lowered into the test container. The cover containing the indicator instruments is placed on the container and sealed. Temperature and relative humidity are recorded at 5 minute intervals until three successive readings are constant to within ½ percentage point of the humidity scale reading. The test curves are plotted in accordance with ASTM C-427 procedures.

Information of the apparatus shown is available from Soiltest, Inc., 4711 West North Ave., Chicago 39, Ill.

Babcock & Wilcox New Recommendation On Universal Pressure Once-Through Boiler Design Announced

The universal pressure once-through type boiler system will be recommended for all electric utility boiler applications requiring turbine throttle pressures of 2000 psi and higher, Babcock & Wilcox announced today. Establishment of such a policy is unique in the boiler industry because it literally endorses a single boiler design concept for application to electric power plants requiring steam pressure above the 2000 psi level at the turbine throttle. The high temperature, high pressure boiler system developed by B&W has proved to be exceptionally economical for these service conditions.

Operating results obtained with units currently in service have proven four primary advantages. These include lower field construction costs, increases plant economy and availability and lower maintenance costs.

New 53 Drive-in Theatre, Chicagoland's first drive-in to go "all electric."

Warms patrons instantly without a furnace

Radiant Electric Heat in the 53 Drive-in Theatre cafeteria delivers instant warmth—saves money and space by eliminating heating plant

Heating this electrically equipped cafeteria is as easy as turning on an electric light. Overhead quartz lamps (plus fan-type and panel heaters) deliver warmth the instant they're turned on. There's no waiting for heat to build up. No waste. No maintenance. Electric Heat completely eliminates costly duct work, piping, radiators and chimneys.

For complete facts on Electric Heat and how this new heating system can fit into your plans, call your Commonwealth Edison or Public Service Company representative.

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